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| APPLICATION NO.  | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO.              | CONFIRMATION NO. |
|--|-------------|----------------------|----------------------------------|------------------|
| 09/810,971   | 03/16/2001  | Sheng Huang          | 10984.3US11                      | 7444             |
| 23552  | 7590        | 03/30/2006           |                                  |                  |
| MERCHANT & GOULD PC<br>P.O. BOX 2903<br>MINNEAPOLIS, MN 55402-0903 |             |                      |                                  |                  |
|  |             |                      | EXAMINER<br>SIMITOSKI, MICHAEL J |                  |
|  |             |                      | ART UNIT<br>2134                 | PAPER NUMBER     |
| DATE MAILED: 03/30/2006  |             |                      |                                  |                  |

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/810,971

Applicant(s)

HUANG ET AL.

Examiner

Michael J. Simitoski

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 23 February 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-9, 12-31 and 34-45 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-9, 12-31 and 34-45 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 16 March 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                        | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)    | Paper No(s)/Mail Date. _____  |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                                    |

### **DETAILED ACTION**

1. The response of 2/23/2006 was received and considered.
2. Claims 1-9, 12-31 & 34-45 are pending.

### ***Response to Arguments***

3. Applicant's arguments filed 2/23/2006 have been fully considered but they are not persuasive.
4. Applicant's response (p. 2) argues that neither reference discloses embedding each latent image into its respective watermark layer by phase modulation. Applicant's response (p. 3) further argues that McGrew fails to disclose phase modulation "as defined above and recited in claim1" because the modulation disclosed in McGrew is "once again a simple alteration of a dot pattern or the repositioning of dots similar to that disclosed in Koltai". It is noted that no definition is given in the claim for "phase modulation". As Applicant has pointed out, Koltai does disclose the repositioning or modulation of a dot. It is noted that the instant specification discloses phase modulation in Fig. 2 (referenced by p. 6, ¶2, §Basic Watermark Layer of the specification), which is shown to be the repositioning of dots (Fig. 2). McGrew teaches that one secure method of watermarking is achieved by creating two dot patterns (either the same or opposite, for example) where when overlaid with each other, the resulting image is either the dot pattern (same) or solid (opposite pattern). One (message pattern) is phase modulated with respect to the original (reference pattern) so that when overlaid, a difference appears. It is in this difference that a watermark is encoded (col. 2, lines 8-27, 32-37 & col. 4, lines 30-43). Applicant cites the appended declaration under 37 C.F.R. §1.132 by Wu Jian Kang for a

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definition of “phase modulation”. On p. 1, #2, declarant states, “It is my understanding that all of the pending claims of the Application are rejected as being anticipated by or obvious in view of Koltai.” However, this statement is not consistent with the current status of the case.

Declarant further states “In my opinion, one skilled in the art would not interpret the simple alteration or repositioning of dots as disclosed by Koltai as “phase modulation””. However, in view of the outstanding rejections, this statement is not persuasive. As Applicant's specification discloses repositioning of dots as “phase modulation” in Fig. 2 and at least on p. 6 of Applicant's specification, Applicant cannot redefine phase modulation via declaration. Further, McGrew discloses modulation patterns that encode a message (col. 4, lines 36-43). If McGrew's images (unmodulated and modulated) are printed on a screen (col. 2, lines 8-27), they exist as a signal when being altered – the signal defining when a dot is to be printed and when not. McGrew discloses that “any modulation of dot positions in the message screen will allow light to pass through the combination of screens in an amount which depends on the amount of displacement of the dots” (col. 2, lines 30-43). The amount of displacement to which McGrew is referring is the modulation amount. In this instant case, the phase of the signal is being modulated which will cause dots to be printed before or after the reference pattern's dot would be printed.

Therefore, even assuming one of ordinary skill would view the phrase “phase modulation” as embedding a signal on a carrier wave via modulating the phase of the signal, as Applicant's response appears to be asserting, the result is the repositioning of dots, as shown in Applicant's Fig. 2. Lastly, as stated in the previous Office Action, U.S. Patent 5,995,638 to Amidror et al. is cited for teaching that the system taught in McGrew, where the final product is a set of modulated dots, is performed using “phase modulation” (col. 1, lines 46-66). As shown in this

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reference, one of ordinary skill in the art, at the time the invention was made, would have interpreted the modulation of dots in McGrew as the result of "phase modulation". Therefore it is maintained that Koltai in view of McGrew discloses phase modulation.

***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1-4, 6-9, 13-16, 20-26, 28-31, 35-38 & 43-45 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 6,104,812 to Koltai et al. (**Koltai**) in view of U.S. Patent 5,396,559 to **McGrew**.

Regarding claims 1-3, 7, 23-25 & 29, Koltai discloses determining a required plural number of watermark layers (Fig. 15) and a dot patterns/secondary images for each of the plurality of watermark layers, selecting at least one latent image object/secondary images for each of the plural of watermark layers (col. 4, lines 11-16) and embedding each latent image object/secondary images into its respective watermark layer (col. 4, lines 11-16), superposing the watermark layers to form the watermark/overall secondary image (col. 4, lines 40-44), defining and generating a decoder for each watermark layer (col. 4, lines 11-16) and applying the watermark to the document/primary image (col. 4, lines 11-16). Koltai lacks explicitly embedding each latent image object into its respective watermark layer by phase modulation and lacks the decoder matching the dot pattern of each corresponding watermark layer. However,

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McGrew teaches that one method of optical watermarking is to obtain two patterns, for example dot patterns where one is phase modulated with respect to the other (col. 2, lines 8-27 & lines 32-37). To the human eye, the patterns are identical, but the small modulations in the message pattern become visible when overlaid with the reference pattern (col. 4, lines 36-43). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to phase modulate each of the watermark layers of Koltai (Koltai, Fig. 15) with respect to a reference pattern/decoder, where the decoder matches the dot pattern of each corresponding watermark layer. One of ordinary skill in the art would have been motivated to perform such a modification to obtain a high level of security, as taught by McGrew (col. 2, lines 8-27, 32-37 & col. 4, lines 30-43).

Regarding claims 4 & 26, McGrew discloses the dot pattern/reference pattern being a linear coordinate mapping of a basic two-dimensional dot array (1:1) (col. 4, lines 36-43).

Regarding claims 6 & 28, McGrew discloses a random dot array (col. 3, lines 3-7).

Regarding claims 8-9 & 30-31, Koltai discloses the latent image objects containing information that is critical to the application (col. 11, lines 45-49).

Regarding claims 13 & 35, McGrew discloses a decoder/reference pattern (col. 4, lines 36-43) for each watermark layer (Koltai, Fig. 15) that has a decoder structure related to a dot pattern structure of a carrier dot pattern/dots of the relevant watermark layer (Koltai, Figs. 19A-19J) and in the direction where the latent image object is embedded (col. 4, lines 36-43).

Regarding claims 14 & 36, McGrew discloses a conjunct/reverse-contrast relationship (col. 4, lines 36-43).

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Regarding claims 15 & 37, Koltai does not specifically disclose sufficient difference, however, as the watermark layers/secondary images are superimposed on the primary image to be later verified, it is inherent that the secondary images are of sufficient difference to avoid interference.

Regarding claims 16 & 38, Koltai discloses a difference between layers to avoid interference (col. 14, lines 47-51).

Regarding claims 20-22 & 43-45, Koltai discloses the watermarks being embedded into the various color channels (col. 14, line 46 – col. 15, line 10 & Fig. 15).

7. Claims 5 & 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Koltai & McGrew**, as applied to claims 2 & 26 above, in view of U.S. Patent 4,828,644 to Ochoa et al. (**Ochoa**). Koltai discloses performing rotations (col. 4, lines 12-25), but lacks the dot pattern including a non-linear coordinate mapping of a basic two-dimensional dot array. However, Ochoa teaches that rotations are linear operations in polar coordinate space (col. 1, lines 23-46). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to include a non-linear coordinate mapping (polar) of a basic two-dimensional dot array. One of ordinary skill in the art would have been motivated to perform such a modification to perform linear operations resulting in a rotation, as taught by Ochoa (col. 1, lines 23-46).

8. Claims 12 & 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Koltai & McGrew**, as applied to claims 11 & 33 above, in view of U.S. Patent 6,636,616 to **Harrington**. Koltai lacks smoothing to avoid abrupt changes. However, Harrington teaches that  $W(x, y)$  (the

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watermarking function) should smoothly transition from one value to another (in this case from -1 to +1) to avoid abrupt visible transitions in the image (col. 5, lines 44-53). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to include a post-processing smoothing step. One of ordinary skill in the art would have been motivated to perform such a modification to avoid abrupt visible transitions in the image, as taught by Harrington (col. 5, lines 44-53).

9. Claims 17 & 39 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Koltai & McGrew**, as applied to claims 13 & 35 above, in view of U.S. Patent 6,345,104 to **Rhoads**. Koltai discloses a counterfeit-proof layer (col. 15, lines 28-33), but lacks the decoder being a photocopier. However, Rhoads teaches that by including watermark verification features (decoder) into a photocopier, the copier can take action if reproduction of a security document is attempted (col. 3, lines 1-26). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to include the decoder in a photocopier. One of ordinary skill in the art would have been motivated to perform such a modification to take action if reproduction of a security document is attempted, as taught by Rhoads (col. 3, lines 1-26).

10. Claims 18 & 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Koltai, McGrew & Rhoads**, as applied to claims 17 & 39 above, in view of U.S. Patent 5,767,889 to **Ackley**. Koltai, as modified above, lacks a post-processing step to remove dots that are too close to adjacent dots in a non-object area. However, Ackley teaches that it is useful to eliminate dots



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on bar code printer to ensure that the bars do not bleed into each other under certain printing conditions (col. 5, lines 43-67). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to remove dots that are too close to adjacent dots. One of ordinary skill in the art would have been motivated to perform such a modification so the dots do not bleed into each other during printing, as taught by Ackley (col. 5, lines 43-67).

11. Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over **Koltai & McGrew**, as applied to claim 1 above, in view of U.S. Patent 5,659,613 to Copeland et al. (**Copeland**). Koltai discloses generating the watermark (Fig. 13), controlling the printing process to protect the document and the watermark from attack (col. 4, lines 35-40) and generating a decoder device to enable verification of the authenticity of the document (col. 8, lines 8-32 & col. 11, lines 26-34, col. 15, lines 28-34). Koltai lacks verifying the authenticity and copyright of the document before printing. However, Copeland teaches that to ensure legitimate use of a product, such as a DVD, the system searches for an authentication signature/watermark and will not play the disk if it isn't found (col. 1, lines 48-50 & col. 2, lines 35-56). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to verify the authenticity and copyright of the document before printing. One of ordinary skill in the art would have been motivated to perform such a modification to ensure legitimate use of the printed matter, as taught by Copeland (col. 1, lines 48-50 & col. 2, lines 35-56).

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12. Claims 41-42 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Koltai & McGrew**, as applied to claim 23 above, in view of “If One Watermark is Good, Are More Better?” by Mintzer et al. (**Mintzer**).

Regarding claim 41, Koltai discloses that the watermark being included in a document for protection (col. 15, lines 27-34), but not for authentication. However, Mintzer teaches that watermarks are often used to determine if an image has been altered (§1.2 ¶2). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to also include information about the document, so as to provide authentication. One of ordinary skill in the art would have been motivated to perform such a modification to verify the content of the object, as taught by Mintzer (§1.2 ¶2).

Regarding claim 42, Koltai discloses watermarking a word (col. 15, lines 27-34).

### *Conclusion*

13. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

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however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael J. Simitoski whose telephone number is (571) 272-3841.

The examiner can normally be reached on Monday - Thursday, 6:45 a.m. - 4:15 p.m.. The examiner can also be reached on alternate Fridays from 6:45 a.m. - 3:15 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jacques Louis Jacques can be reached at (571) 272-6962.

**Any response to this action should be mailed to:**

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

**Or faxed to:**

(571) 273-8300  
(for formal communications intended for entry)

**Or:**

(571) 273-3841 (Examiner's fax, for informal or draft communications, please label "PROPOSED" or "DRAFT")

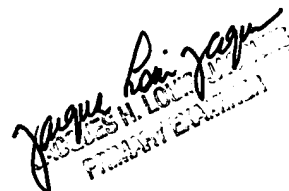
Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (571) 272-2100.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

MJS



March 27, 2006



Jacques Louis Jacques  
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FEB 27 2006